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Structural Design & Analysis of The Innovative Tip Brake of The NMITLI 500 kW Wind Turbine System

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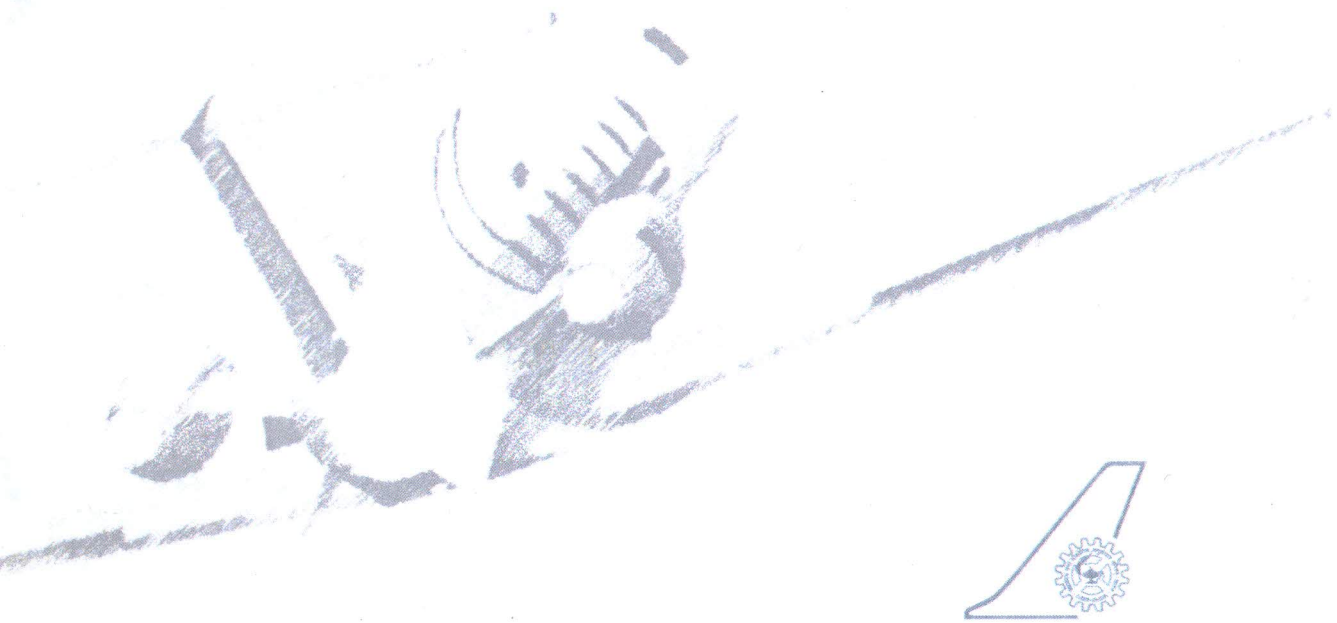

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Abstract: This project document deals with the design and analysis of aerodynamic brake for a 500 kW wind turbine. This aerodynamic brake is mounted on the tip of the wind turbine blade. The tip brake (aerodynamic brake) consists of two primary members, namely, 1) main tip brake and 2) spoiler flaps. The loads acting on the main tip brake and spoiler flaps are 3.15 kPa and 3.95 kPa respectively. The material chosen for the design is CFRP because of its high stiffness and strength. The design is based on the regular spar and rib construction. Analysis has been carried out with the classical laminate theory and it is found that the maximum stresses are within the permissible limits. Further, analysis of the torque shaft is also carried out and it is found that the stress in the shaft is within the limits.